

LOCAL COMMUNITY PARTICIPATION IN PROTECTION AREA OF WATER RESOURCES CONSERVATION IN THE RINJANI FOREST MANAGEMENT UNIT (FMU) OF RINJANI BARAT, LOMBOK ISLAND

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ABSTRACT: The objectives of this study are: (1) to examine the participation of local communities in the conservation of water resources, (2) to analyze the determinants of participation, and (3) to formulate a participatory water resource conservation model. This research was carried out in the area of West Rinjani Protection Forest Management Unit (KPHL). Data and information were collected by means of interview, in-depth interview, document tracking, and observation. Data were analysed descriptively. Multiple regression with logistic models was used to analyze the determinant of participation. Results showed that (1) local community participation in the conservation of water resources in the Rinjani Barat KPHL area is high (more than 40%); (2) community involvement are in the form of protection of springs, preservation of catchment areas, maintenance of canals, and utilization/management of natural tourism; (3) determinants of local community participation in the conservation of water resources are age, distance of the house from the forest area, and length of stay in the area; (4) a participatory and sustainable spring conservation model is the economic empowerment of the local community through the development of Non Timber Forest Product (NTFP) small businesses and the development of ecotourism.

Keywords: Participation, Community, Conservation, Water, Rinjani

1. INTRODUCTION

The current water crisis has been felt widespread globally. The United Nations (UN) declared that 2005-2015 as a decade of "Water for life", to raise awareness of the world community to jointly prevent water crises in the future [1][2][3][4][5]. Nowadays, water resources crises occur in various regions as indicated by the drying up of several springs. According to [6][7][8][9][10], this water crisis will be overcome through the conservation of water resources.

Efforts to maintain the sustainability of water availability are through water resource conservation activities. According to [11][12][13][14][15] water resources conservation activities consist of 3 (three) main activities, namely: (1) protection and preservation of water resources, (2) water preservation, and (3) quality management and control of water pollution. Furthermore, Sudarmadji, et al. (2012) emphasized that the support and participation role of various parties, including the government, business company, universities institutions and community groups is needed in maintaining the preservation of water resources through conservation activities.

Various conservation efforts have been carried out, including vegetative methods, which

have been carried out in the form of mass community service work, field schools, technical assistance, pilot projects. More holistic concept also was developed, namely the establishment of the Conservation Village Model (MDK). The establishment of MDK was initially considered as an appropriate effort, because it could unite various interests by prioritizing conservation as the estuary of all activities in one region or village [16][17].

The area of West Rinjani Protection Forest Management Unit (KPHL) is the upstream of various watersheds which are sources of water for the people in four regencies / cities in Lombok Island, namely Mataram City, West Lombok Regency, North Lombok and Central Lombok. The potential of water resources is needed to meet the needs of drinking water, irrigation, dams, micro hydro power plants, and other needs.

The West Rinjani KPHL forest area faces various environmental problems, namely deforestation and forest degradation. Global Forest Watch reports that deforestation (loss of forest) in this region during the period 2001-2013 amounted to 1,300 ha which was allegedly related to illegal logging. Meanwhile in the period 2014 - 2017 the change was relatively low around 150 ha

[18][19][20][21][22]. The existence of communities around KPHL is a component that cannot be ignored in the framework of forest protection and utilization. [24][25][26][27] [28] emphasized that the involvement of local communities in the protection and preservation of Rinjani Forest was carried out through the management of customary forests by traditional institutions with various forms of local wisdom. One form of local institutions in the Mount Rinjani Forest Area that exists in forest management is the Bayan Indigenous Institution. In relation to the forest, the Bayan Indigenous Institution has created certain rules (the local language "awig-awig") regarding the pattern of community relations with the forest. The form of the rules includes the prohibition of exploiting forests for personal interests, burning, hunting animals, tending livestock, immoral acts, polluting water sources and other actions that harm common interests in the customary forest area [30][31][32][33][34]. The enforcement of customary sanctions in this case is very strict and is supported by the obedience and awareness of community members. The vital function of the forest as a primary spring is also well recognized by the local community.

Conservation of water resources in the Rinjani Barat KPHL area is not only the duty of the government, but also the responsibility of all components of the community. In fact, the success of sustainable forest management so far is not determined by the large amount of funds allocated for these activities, but is strongly influenced by community involvement and participation [35][36][37][38]. Based on this description, it is necessary to conduct a comprehensive study on "Local Community Participation in Protecting Water Resources Conservation Areas in the Protected Forest Management Unit (KPHL) of West Rinjani, Lombok Island". The objectives of this study are: (1) to examine the participation of local communities in water resources conservation, (2) analyze the determinants of local community participation in water resources conservation, and (3) formulate a participatory water resource conservation model in the Rinjani Barat KPHL area.

2. RESEARCH METHODS

This study uses descriptive methods that are directed at efforts to collect and analyze information / data from an activity related to water resource conservation. A systematic, factual and accurate description is made on the

facts, properties and relationships between the phenomena studied. This research was carried out in the area of West Rinjani Protection Forest Management Unit. Data and information were collected by using various approaches/techniques as follows: (1) interview, (2) in-depth interviews, (3) document tracking, and (4) direct observation to the field. The number of samples used in this study is 40 households. Data analyzes in this study includes: (1) the analysis of perceptions and participation in the conservation of water resources, and (2) multiple regression analysis with a logistic model approach to determine the determinants of participation.

$$Ln \frac{\pi_i}{(1 - \pi_i)} = \alpha + \sum_{j=1}^n \beta_j X_{ji} + \sum_{k=1}^m \gamma_k D_{ki} + e$$

Where:

π_i = Community opportunities to participate ($\pi_i = 1$, if the community participates;

$\pi_i = 0$ if the community does not participate)

$1 - \pi_i$ = Community opportunities do not participate

$\pi_i / (1 - \pi_i)$ = Odds ratio (risk)

X_j = free variable vector ($j = 1, 2, \dots, n$)

D_k = dummy variable vector ($k = 1, 2, \dots, m$)

α , β , and γ_k = the alleged parameters of the logistic function

e = random error

3. RESULTS AND DISCUSSION

3.1. Perception of Local Communities in Protecting the Area

Water Resources Conservation (WRC)

Rachmat (2005), argues that perception is an experience about objects, events, or relationships obtained by concluding information and interpreting messages. In other words, perception is giving meaning to sensory stimuli where each person or society will have different perceptions depending on their individual sensory stimuli. Meanwhile, in some literature it is mentioned that perception is one of the components of attitude.

In this study, the perception is defines ad how the community's messages and responses to the water resources conservation area in the West Rinjani KPHL forest area. The results of the study show that the community's understanding of water resources conservation is quite diverse, but in general they know that water resource conservation is a forest area that is a spring protection. The study results as presented in Table 1 show that the majority (62.50%) of the community had heard and knew about water resources conservation.

Table 1. Community Knowledge and Perception about Conservation of Water Resources in the Forest Region of West Rinjani FMU (KPHL).

NO	DESCRIPTION	NONBER OF RESP (person)	PERCENT (%)
1.	Learn about the Water Resource Conservation Area (WRC)		
	a. Know	25	62,50
	b. Do not know	15	37,50
2.	The importance of the existence of WRC		
	a. Important	25	62,50
	b. Not Important	-	
	c. No answer	15	37,50
3.	Necessity of preservation WRC		
	a. Should	25	62,50
	b. Not should	-	
	c. No answer	15	37,50
4.	The reason WRC must be preserved		
	a. Protect springs	22	55,00
	b. Prevent floods / landslides	3	7,50
	c. No answer	15	37,50
5.	The perceived benefits of the WRC		
	a. Water availability is guaranteed throughout the year	20	50,00
	b. Coolness	3	7,50
	c. Get free water	2	5,00
	d. No answer	15	37,50
6.	What needs to be done to protect the WRC		
	a. Don't cut down trees carelessly	31	77,50
	b. Plant a tree around a spring	8	20,00
	c. Does not pollute water bodies	1	2,50

Furthermore, the whole community who already know about water resources conservation, assesses that the existence of a water resource conservation area (WRC) is important and must be preserved. Various reasons were given in this regard, but the most important reason was to protect the spring. The benefit of the existence of WRC which is felt most by the community is the guaranteed availability of water throughout the year. They also realize and know what needs to be done to protect the WRC, namely (1) not cutting down trees carelessly, (2) planting trees around springs, and (3) not polluting water bodies.

3.2. Local Community Participation in Protecting Conservation Areas of Water Resources

Assessment of the Importance of Local Community Participation

The policy to involve the community in all aspects of forest management is basically an effort to save the forest with its biodiversity that is aligned with efforts to optimize its benefits for the community. For example, to reduce the development of illegal logging activities in production forests, a HPH company in Central Kalimantan did a partnership in harvesting logs with village cooperatives around the forest. The results include local entrepreneurs and

communities around the forest that have begun to feel justice in enjoying the existence of production forests. [29] concluded that the Merap and Punan Dayak communities in East Kalimantan assessed the importance of primary forests based on the following number of things: (1) as a source of livelihood both directly and indirectly, (2) the existence of historical values which must be maintained downward - hereditary, and (3) has an abundance of valuable resources such as plants and animals. Darusman (2002), emphasized that in general the closer community involvement related to the main business activities will have a greater impact and more guaranteed for sustainability. Therefore, programs/ businesses of various parties, including entrepreneurs in the context of developing village communities around the forest, should have forms of activities that are more closely related to the main forestry business, or even an integrated part of the main business activities. Expected benefits are: employment opportunities, business opportunities, as well as the transfer of science and technology and management. Regarding community participation in the protection and preservation of water resources conservation areas in the Rinjani Barat Forest Management Unit, there are a number of community evaluation points as presented in Table 2.

Table 2. Evaluation of the Importance of Community Participation in Conservation of Water Resources in the Forest Region of West Rinjani KPHL

NO	DESCRIPTION	NONBER OF RESP (person)	PERCENT (%)
1.	The need for WCA management involves the community		
	a. Need	35	87,50
	b. No need	5	12,50
2.	Communities that need to be involved in the WCA		
	a. All society	29	72,50
	b. Religious leaders	3	7,50
	c. Community Figure / Custom Figure	7	17,50
	d. Village government officials	1	2,50
3.	In what ways the community needs to be involved in the WCA		
	a. Program and activity planning	7	17,50
	b. Implementation	5	12,50
	c. Supervision	22	55,00
	d. Maintenance of springs	6	15,00
4.	So far involvement in the WCA		
	a. involved	16	40,00
	b. Not involved	24	60,00
5.	Who invited involved in the WCA		
	a. Own desire / will	1	2,50
	b. Invited by neighbors / friends	5	12,50
	c. Invited by Village Officials	4	10,00
	d. The other	30	75,00
6.	The nature of involvement in the WCA		
	a. Volunteer	9	22,50
	b. Paid for	2	5,00
	c. Combined (a) and (b)	29	72,50

The results of the study as presented in Table 3.2 show that almost all respondents (87.50%) recognized the need to involve the community in the management of water resources conservation areas (KKA) in the forest area of West Rinjani KPHL. Only a small portion (12.50%) thinks that the community does not need to be involved because it is entirely the responsibility of the government. With regard to the community that needs to be involved; most (72.50%) expect that all communities will be involved as a form of shared responsibility of all citizens, especially those who benefit directly from the presence of water conservation areas. There is also a small portion (27.50%) who think that what needs to be involved are certain people such as: religious leaders, community leaders/traditional leaders, and village government officials.

Regarding the need to involve the community; the results of the study also indicate that community involvement needs to be carried out, starting from planning, implementing, maintaining, to monitoring activities. However, the most important thing is the involvement of the community in terms of supervision. This is understandable, considering the number of personnel is very limited with a wide range of supervision that is less effective. Therefore, the

involvement of the community in conducting supervision is very necessary. However, to avoid social conflict on the ground, the mechanism and legality need to be regulated.

Types and Forms of Community Engagement

Community involvement/participation in the protection of water resources conservation areas in the West Rinjani KPHL forest area is high. More than 40% of the community claimed to be involved, either because of their own desires or invited by friends/neighbors or local village officials, where the nature of their involvement was generally voluntary. Community participation or involvement is carried out directly in various stages; starting from the stages of planning, maintenance, and supervision/security. Indirectly, community participation is reflected in its adherence to laws and regulations, as well as adherence to local rules or regulations (awig-awig).

Some community involvement is done privately (personnel) and some is done through the KTH/Gapoktan group institutions or gathered in business entities such as cooperatives and community service. For example, involvement in planning; the community (through representation)

was involved in the preparation of the West Rinjani KPHL RPJP.

Institutionally community involvement in the management of conservation areas continues to be developed primarily through community development and empowerment activities both through the mechanism of Social Forestry and cooperation in the utilization of forests with community business institutions such as Cooperatives and Bumdes. In the cooperation document, it contains the obligations of stakeholders including those related to the obligation to manage the existence of a spring in the location that is cooperated to remain protected and conserved and can be used as a source of clean water and natural tourism properties.

In term of the use of springs for clean water, people are only asked to actively and intensively maintain the preservation of springs for nature tourism. Communities that have been bound through a cooperation agreement, in addition to being active in efforts to preserve springs as well as being operators in the management of natural tourism, and must submit profit-sharing according to the provisions in the agreement to the FMU.

So far, community involved in several activities, namely: (1) in terms of protection: 200 m radius of springs must be maintained as a protection spot that must be a shared responsibility and should not be cultivated by farmers, (2) conservation of catchment areas: make efforts to increase the cover of the catchment area through planting seedlings derived from the FMU or from non-governmental organizations, (3) channel maintenance: forest farmer groups cooperating to maintain waterways and pipes to the community, (4) utilization / management of natural tourism: ticket collection tourism and parking, maintaining security and order at the tourist site, managing cleanliness, checking the condition of natural tourism infrastructure and ticket reconciliation with KPH officers.

Determinants of Local Community Participation in Protection Water Resources Conservation Area

To determine the determinants of local community participation in the protection of the Water Resources Conservation area, multiple regression analysis was performed. In this case as the dependent variable or response variable is community participation (dummy), while the explanatory variable or independent variable consists of several quantitative and qualitative variables. The analysis results are presented in Table 3.

Table 3. The magnitude of the Regression Coefficient of Influencing Factors Community Participation in KKA Protection

		Variables in the Equation					
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	Age	-.276	.158	3.062	1	.080	.759
	Middle school	1.365	2.078E3	.000	1	.999	3.916
	High school	3.338	2.078E3	.000	1	.999	28.170
	Distance_Home	-13.162	6.558	4.028	1	.045	.000
	length of stay	.364	.152	5.754	1	.016	1.439
	non-timber forest products	.000	.000	.602	1	.438	1.000
	Interaksi	14.322	1.808E4	.000	1	.999	1.659E6
	forest farmer group membership	.224	1.590	.020	1	.888	1.251
Constant	-5.145	1.820E4	.000	1	1.000	.006	

a. Variable(s) entered on step 1: Umur, SMP, SMA, Jarak_Rumah, L_tinggal, HHBK, Interaksi, A_KTH.

The analysis results presented in Table 3.3 above show that there are 3 (three) factors/variables that can explain or significantly affect the participation of local communities in the protection of the Water Resources Conservation area in the West Rinjani KPHL forest area. These three factors/variables are the age of the community, the distance between the house and the forest area, and the length of stay (domiciled)

in the area (around the forest area of West Rinjani KPHL).

Age has a positive effect on participation; meaning that the older a person is, the higher his participation in the protection of the Water Resources Conservation area in the West Rinjani KPHL forest area. Likewise, the length of stay in the area has a positive effect on its participation in the KKA protection. This indicates that their awareness is getting higher

along with the length of time they interact with the natural environment. Meanwhile, the location or distance of the residence from the forest area has a negative effect on community participation. That is, the further away the location of his residence from the forest area, the lower the level of participation and vice versa.

3.3. Participatory Water Resources Conservation Model in the FMU area of Rinjani Barat

The economic approach to date is considered to be a fairly appropriate method in strengthening the participation of local communities in conservation. With regard to increasing the participation of local communities in the spring protection movement, one alternative solution that can be taken is to empower the family economy. This economic empowerment is endeavored to have multiple goals/objectives, namely: besides being able to improve the welfare of the target communities, it is also expected to guarantee environmental sustainability. One of the potential activities to be developed in the West Rinjani KPHL area is the N.TFPs small business development.

Non-Timber Forest Product Utilization (NTFPs) has not been developed optimally as part of sustainable management of forest resources. Besides honey, NTFPs that are possible to be developed in forest areas are medicinal plants, mushrooms, ornamental plants, animal feed, freshwater fisheries, and other productive business activities. The development of non-timber forest product activities (NTFPs) can be integrated with other activities both in the forest area and outside the forest such as in the yard or in community gardens that have not been used optimally.

Based on experience in developing various types of agricultural commodities, the main factor that most determines the success and continuity of community businesses (farmers) is the availability of markets. This experience can be adopted for the development of empon-empon, whose market has so far been limited with uncertain prices. Therefore, to ensure the sustainability of this business, an alternative that can be done is to develop in groups and designed in the form of an Integrated Partnership Program (PKT). In this case the partnership involves 3 parties, each: (1) the community as plasma participants who are members of a cooperative or joint business group (KUB); (2) herbal medicine processing industry or inter-island traders as business partners; and (3) Local government as facilitator and coordinate with related agencies / agencies, NGOs, and universities.

The weakness so far that the preservation of Rinjani Forest water conservation areas is less secure is the lack of budget support to conduct a forest resources inventory including an inventory of springs within the forest area., It is very important to compile a data base as a basis for managing and conserving springs. Besides that, sectoral and upstream-downstream stakeholders in the preservation of springs are still not well integrated, where coordination has not been carried out properly.

4. CONCLUSION

The involvement (participation) of local communities in the conservation of water resources in the West Rinjani KPHL area is high (more than 40%), in the stage of planning, maintenance, and supervision/security. Community involvement are in the form of : (1) protection of springs with a radius of 200 m, (2) conservation of catchment areas, (3) maintenance of canals, and (4) utilization/management of natural tourism. Factors determining the involvement (participation) of local communities in the conservation of water resources, in the forest area of West Rinjani KPHL are the age of the community, distance of the house from the forest area, and length of stay (domiciled) in the area (around the forest area of West Rinjani KPHL). Participatory and sustainable model of spring protection conservation in the West Rinjani KPHL area that is most likely to be the economic empowerment of local communities, among others through the development of NTFP small businesses and the development of ecotourism.

5. SUGGESTION

Based on the results of studies and findings in the field, it can be suggested that the socialization of action programs for the protection of water resources conservation areas in the West Rinjani KPHL area should continue to be promoted to all levels of society (including local communities). Besides that the program offered should be an economic incentive for local people to participate in the movement of water resources conservation.

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